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Study the Physico – Chemical parameters of river (Kamwadi) in Bhiwandi, District Thane Maharashtra

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Abstract

The present study was undertaken to analyse physico – chemical parameters of river water situated in Bhiwandi, Thane district of Maharashtra. The period for the study was from February 2013 to May 2013 at six sampling stations. The physico – chemical parameters such as water temperature, pH, COD, Alkalinity, BOD, TDS, SS, and some metals were investigated. The fluctuations in some physico – chemical parameter were noted during the study period. The values of pH were found to vary from acidic to alkaline. The results indicated that the river water is polluted.

Keywords: Physico – Chemicals parameters, Heavy Metals, water pollution, waste material.

1. Introduction

Water is the one of the most essential commodities of the society. Now a day's water pollution is the challenging problems today. The unwanted substances are being regularly added to our environment, make it unsafe to live. Population growth, rapid economic development and unconscious human activities are slowly transforming our planets into a rotten place. The water from various places is getting polluted and thus the polluted water is leading to health hazards among the population.

Bhiwandi has one of the famous cotton-textile industrial area from the 16th century and it was a port. Now that port has converted to a narrow river and which is under the serious threat as a result of the growing urbanization and industrialization. At the bank of the river, industries have been settled and which pollutes the river, due to the effluent is discharged into the river basin and chemical water in it.

In the 16th century A.D the big ship was arriving in Bhiwandi Nizamshah were trading through the sea routes, now a days the sewage along with the garbage is disposed off either directly or indirectly into the river through a number of wide drains and results in heavy water pollution.

2. Materials and Methods

Water samples were collected in every month from February 2013 to May 2013 for a period of four months. The sampling was done in polythene bottles (1 – 1.5 liters capacity). The temperature and colour of water samples were measured on the spot immediately after collection with the help of mercury glass thermometer. The other physico – chemical parameters of the water were determined in the laboratory using the standard method. For digestion and pre concentration of water samples standard methods were followed.

3. Results and Discussion

The physico – chemical parameters for the four month with six sampling stations are as follows:

3.1 Temperature

Temperature is an important physical factor which controls the natural process of the environment. It was observed in accordance with the seasonal changes the temperature of water was ranged between 28 °C to 40 °C it was higher in May and lower in February.

3.2 Biochemical Oxygen Demand (BOD)

Biochemical oxygen Demand (BOD) is the amount of oxygen required by living organisms for their physiological process. Increased organic matter results in the excess oxidation of organic matter in May. Minimum B.O.D. was reported for sample S6 while maximum values was reported for sample S3.

3.3 Chemical Oxygen Demand (COD)

Chemical Oxygen Demand (COD) is the amount of oxygen required for the decomposition of chemical waste. A high value of COD shows a higher accumulation of organic waste in the river. It was found higher in May (484ppm) in S3 sample and lower in February (70ppm) in S2 sample.

3.4 Total Dissolved solids (TDS)

Total Dissolved solids (TDS) are the important parameter for the use of water. The water with a high TDS value indicates that water is mineralized. The concentration of TDS in the present study was observed in the range of 735ppm to 1760ppm.

3.5 Suspended Solids (SS)

Suspended Solids (SS) indicates the salinity behaviour of water. It has been observed that S.S. values were very fluctuation i.e. higher in May and lower in February and ranged between 98ppm to 480ppm.

3.6 pH

pH is a term used to show acidic and alkaline nature of water. The water of the river was found to be slightly acidic and alkaline. The pH values of water samples varied between 6.90 to 7.8

3.7 Alkalinity

It constitutes an important parameter in determining the quality of water. A variation in Alkalinity values was recorded as a minimum of 130ppm in S2 sample in the month of February and maximum of 408ppm in S6 sample in the month of May. Furthermore the total alkalinity was significantly higher in S6 than that of other sites.

3.8 Calcium and Magnesium

The presence of calcium in water results, from passage through or over deposits of limestone, dolomite and gypsum. Small concentrations of calcium carbonate combat corrosion of metal pipes by laying down a protective coating. Appreciable calcium salts on the other hand precipitate on

heating to form harmful scale in boilers, pipes and cooking utensils.

Low value of calcium of 59ppm was seen at S5 sample in May and highest value 70.12ppm at the S1 sample in May, similarly low value of Magnesium 21.2ppm at the S4 sample in February and the highest value 31ppm at the S6 sample in May.

3.9 Iron

In present investigation, iron concentration of S2 sample is highest i.e. (1.46ppm) May and lowest concentration is 0.41ppm of S6 sample in the month of February. Biota at this site may be vulnerable to various metabolic disorders and abnormal behaviour. Iron in water is considered as micronutrient when its concentration is less than 0.3ppm.

3.10 Lead and Arsenic

Lead is also found in water, which causes diseases it's a huge problem due to consumption of lead. In present investigation lead concentration of sample S2 is highest 1.19ppm in May and lowest concentration is 0.02ppm of S1 sample in February, similarly arsenic concentration of S2 sample is highest in May i.e. 0.14ppm and lowest concentration is 0.02 of S5 sample in February.

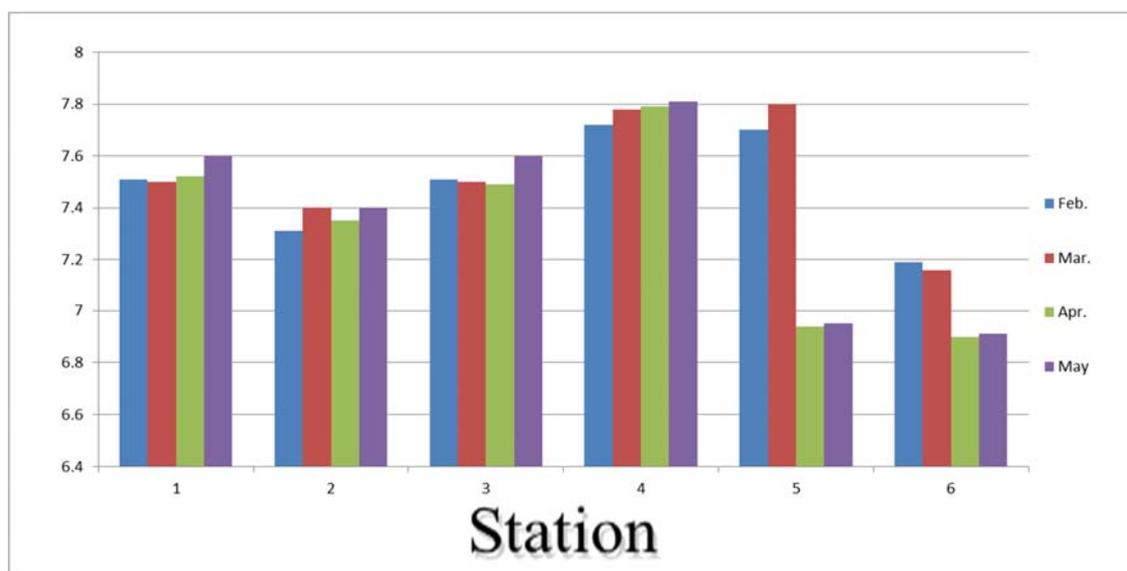
3.11 Sodium

As per present investigation sodium is also found in the sample. The highest concentration is found S1 sample at May i.e.1680ppm and lowest concentration is found in S6 sample at February i.e. 190ppm.

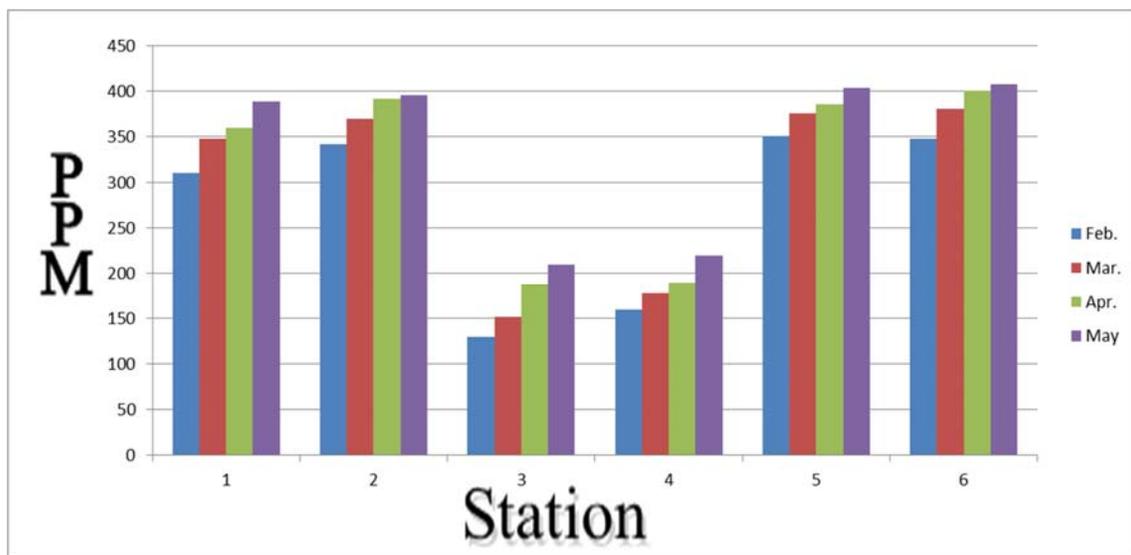
3.12 Phenols, Oil and Grease

Phenols, Oil and Grease are also found in the sample station. Phenol as lowest concentration in S5 sample i.e. 0.01ppm and highest concentration in S4 sample i.e. 2.34ppm, similarly Oil and Grease as lowest concentration 1.8ppm in the S2 sample at February a higher concentration is 11.5ppm in the S4 sample at February.

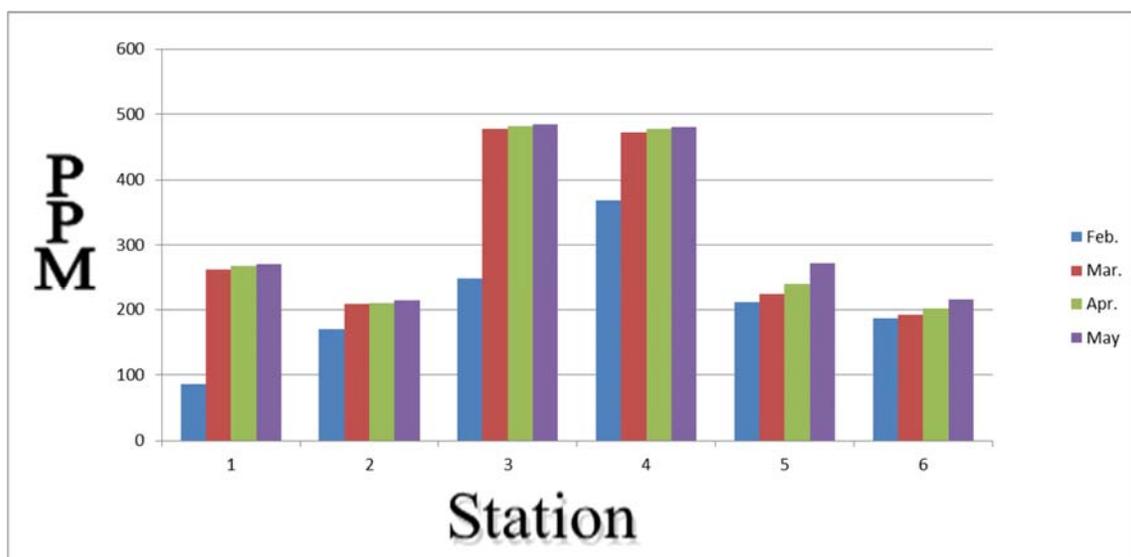
pH



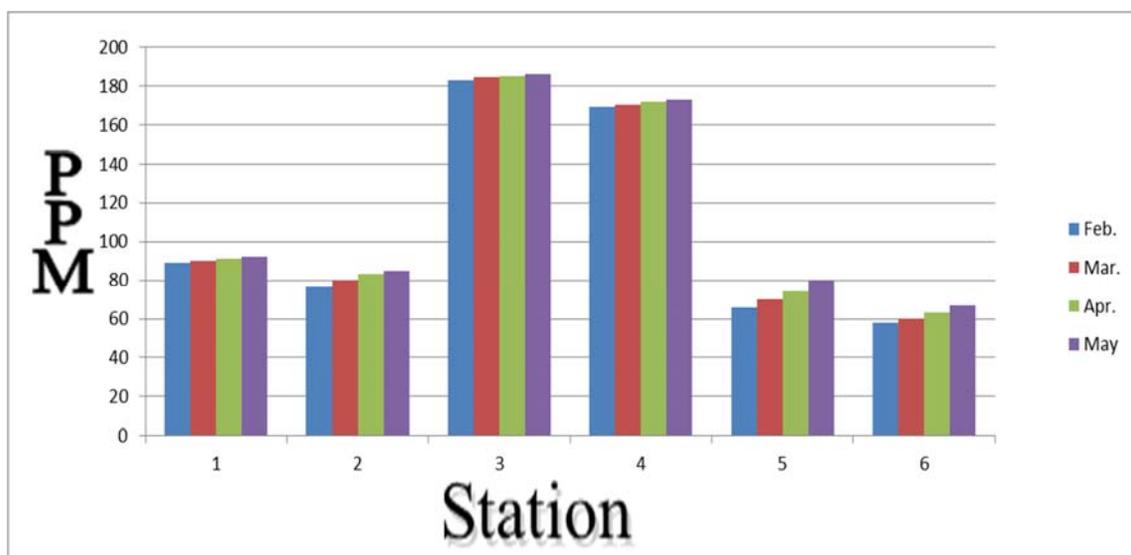
Alkalinity



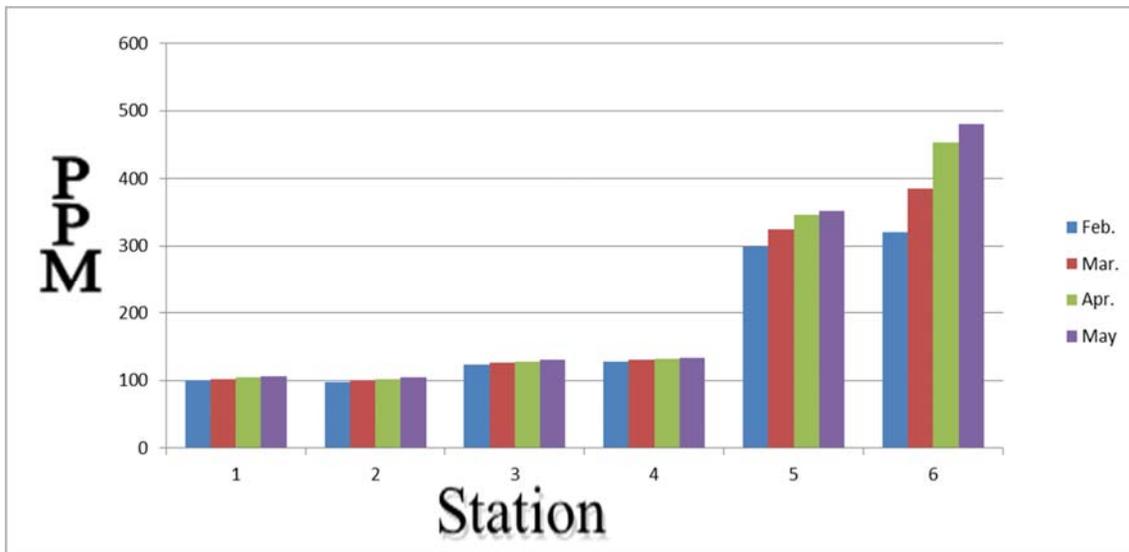
COD



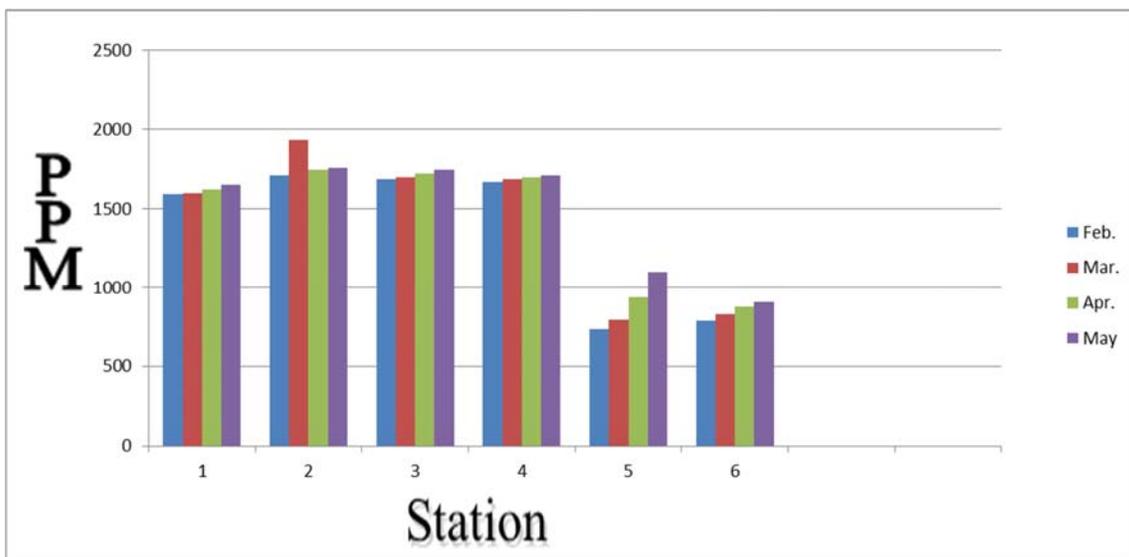
BOD



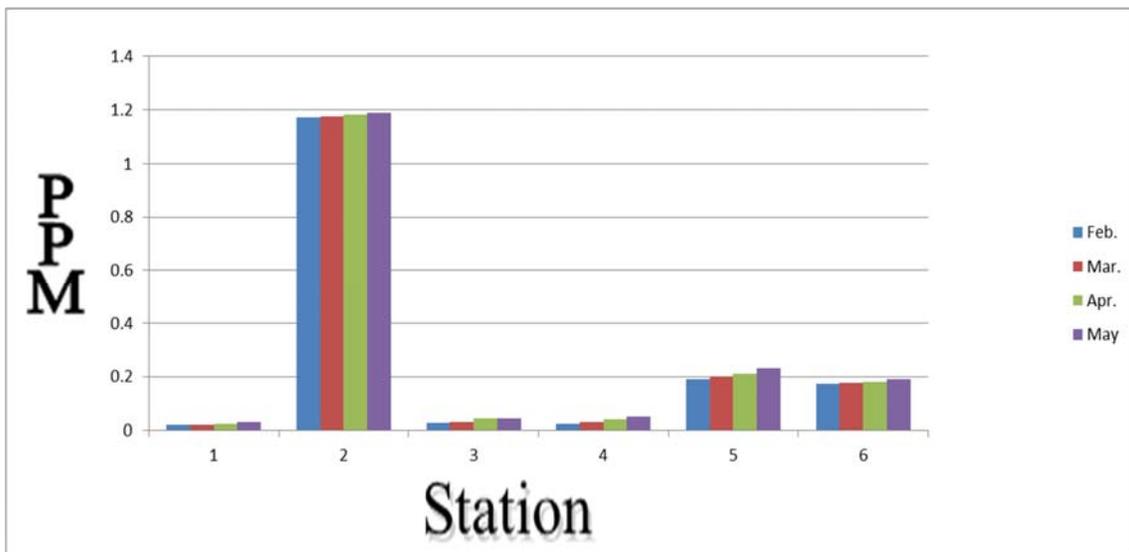
S.S



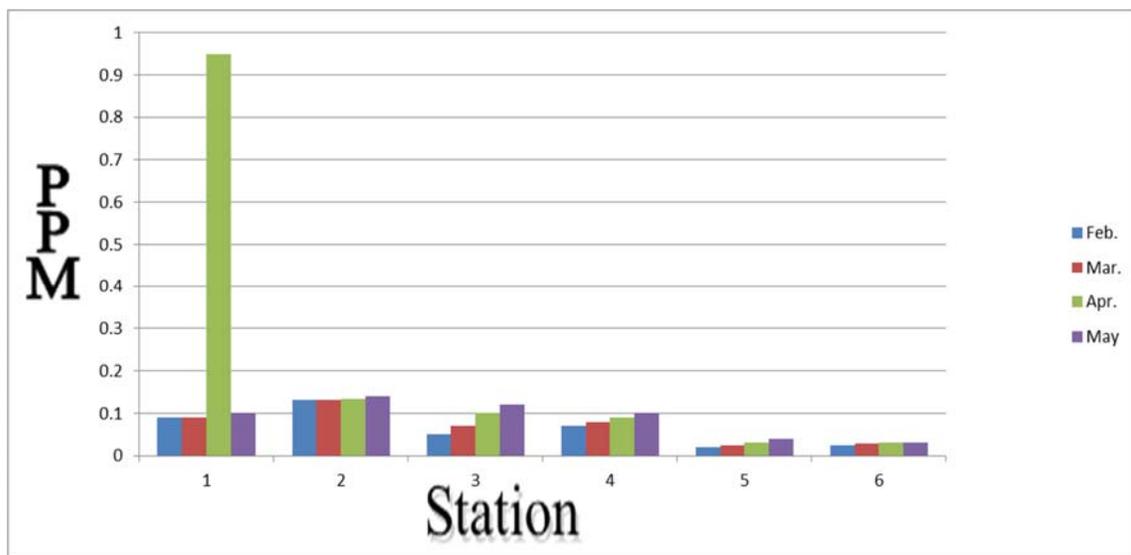
T.D.S.



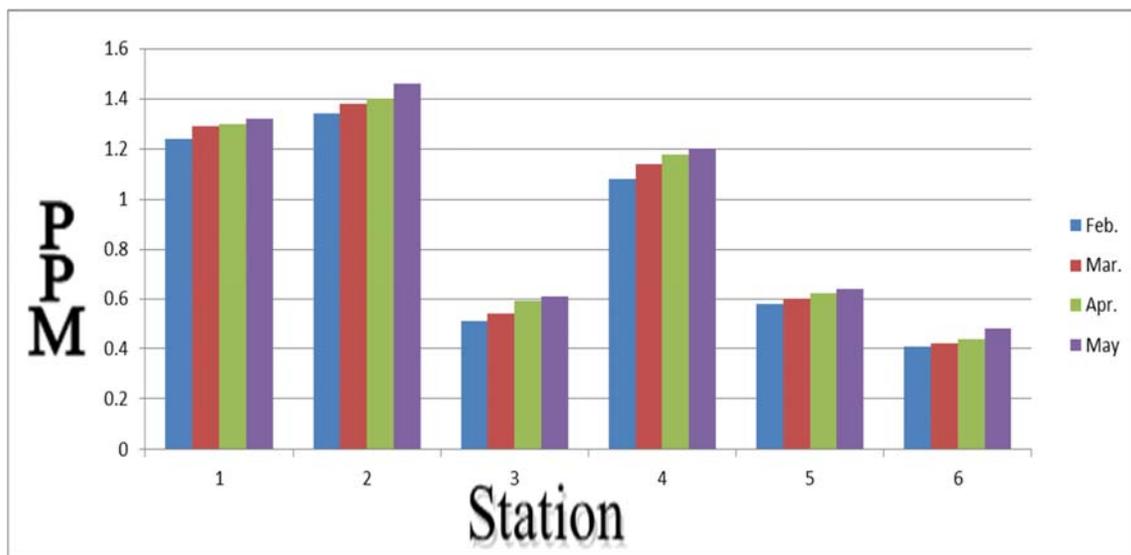
Lead



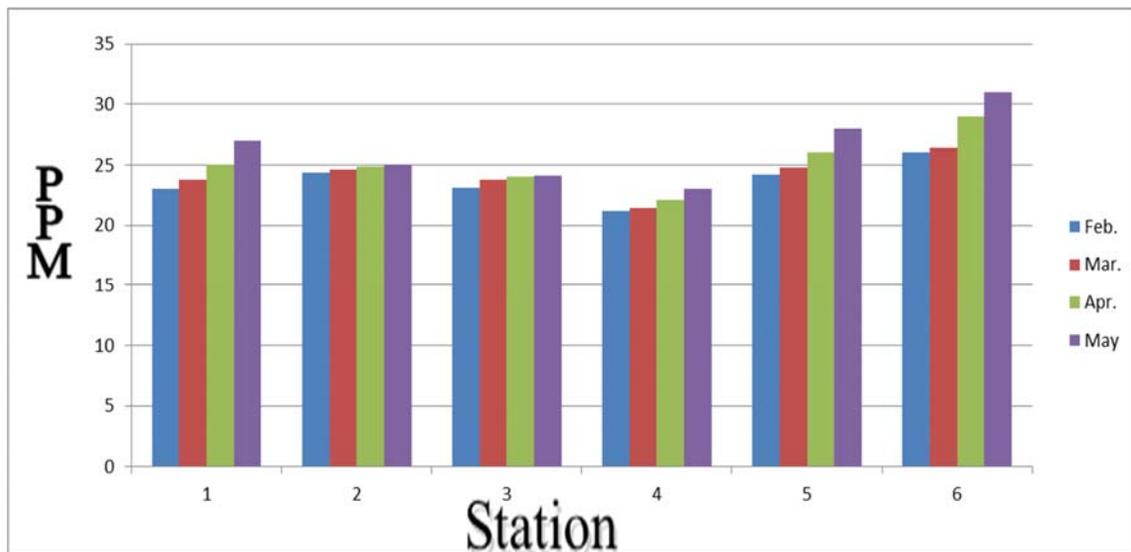
Arsenic



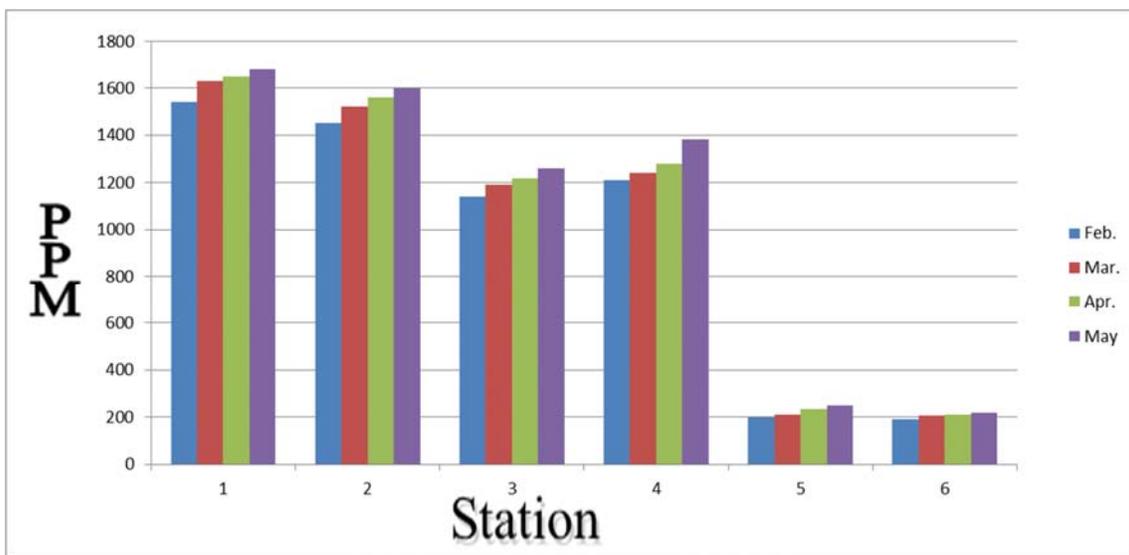
Iron



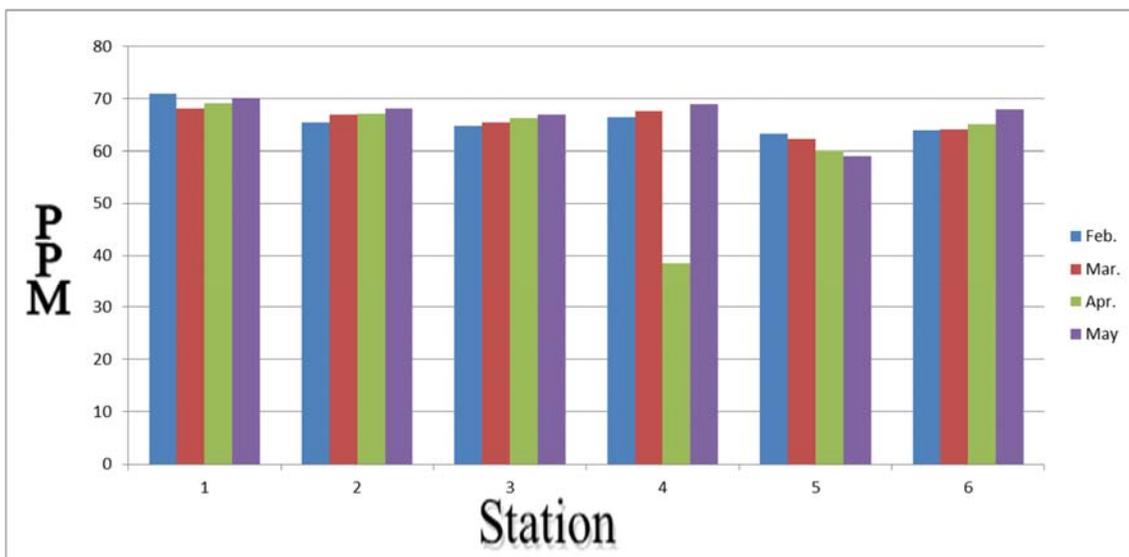
Magnesium



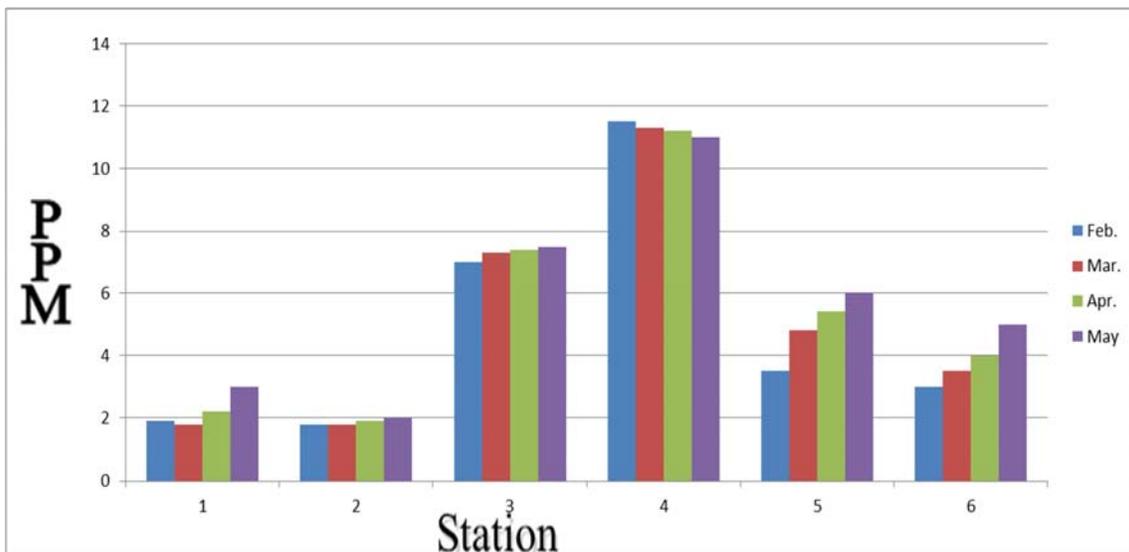
Sodium



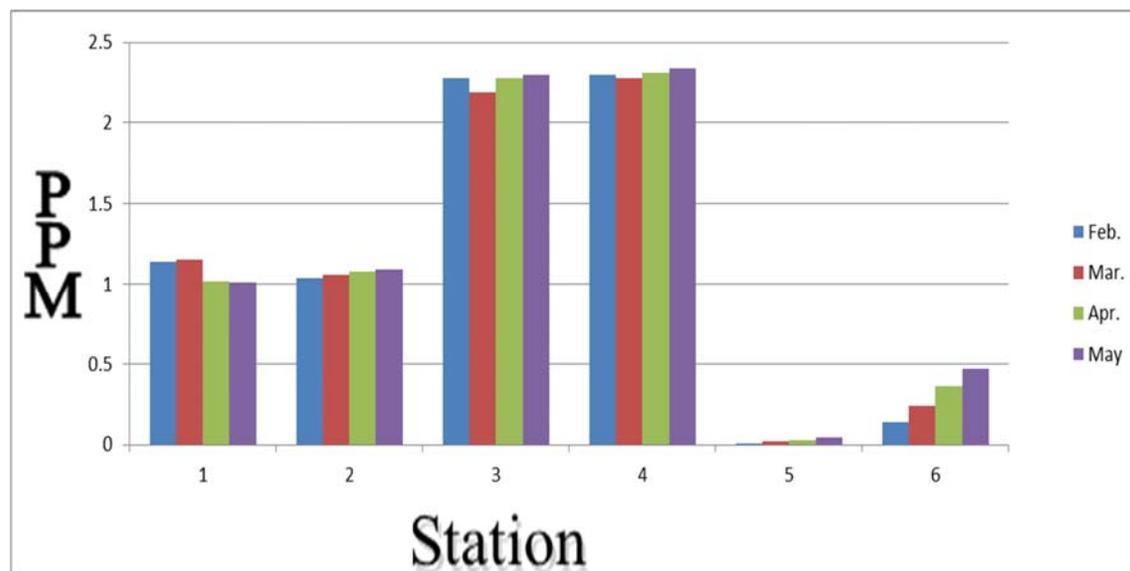
Calcium



Oil and Grease



Phenols



Note: No Bar Graph- Below Detectable Level

4. Conclusion

The physico-chemical study showed that the parameters like TDS, SS, BOD, COD, Alkalinity, and other metals as per the standard given. This results shows that the water is contaminated. The water is also receiving many solids by depositing nirmalya (the leaves, flowers used at the time of pray) and other domestic waste material.

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